

## Department of Chemistry & Physics

PHYS-2041. GENERAL PHYSICS LAB (3-3-3). Apply the laws of electricity, magnetism, electromagnetic induction, direct current, alternating current, circuits, electromagnetic waves, and optics in lab works. Prerequisites: registration in or credit for 2040; Mathematics 2100.

**Required material:** Lab book written by Dept. Chemistry and Physics, NSU. Edition 2005.

**Content:** Electricity, magnetism, electromagnetism, simple circuit elements and networks, electromagnetic waves, optics: geometric and wave optics.

### Course Goals:

1. Supplement the content of PHYS 2040.
2. give students hands-on experience at designing and performing experiments to investigate concepts of physics
3. introduce the student to techniques for making physical measurements.
4. train the student to identify potential sources of error or uncertainty in an experiment.
5. illustrate the use of the scientific method.

**Course Objectives:** The student who completes this course should be able to:

- a. define electromagnetic concepts and physical quantities
- b. describe different procedures to put into evidence electric field, electric potential and their geometric configurations
- c. measure intensity of electric field and potential difference
- d. measure electrical physical quantities in DC and AC
- e. define, explain and apply magnetism and its relation to electricity
- f. design and use DC and AC simple RLC circuits
- g. understand and apply induction laws
- h. design and explain geometric optics configurations of mirrors and lenses
- i. understand and apply wave properties of light: polarization, diffraction, interference

Each laboratory period (and its associated lab report, including any required exercises, pre-quizzes, post-quizzes and homework) is assigned a value of 85% out of the final grade (the final test is 15%). You will maintain a lab notebook containing all your work from lab throughout the semester (with any necessary attachments, documents, down-loaded graphics, spreadsheets, etc.) stapled inside. Starting with the second laboratory session, you will be expected submit one copy of your lab report. Each lab report will consist of an introduction (see below), a copy of your in-class results as well as a copy of your calculations. Each lab report should be typed or neatly written with a carbon copy of you in class results attached. In general, a lab report for this class includes.

1. Physics introduction. Physical principles and theoretical underpinnings
2. Brief description/purpose, aim, goals.
3. Description of the method: at least 2 paragraphs discussing and explaining the experiment.
4. Tools, equipment, installations, devices, computer software, set-up, etc. available for this lab work
5. Analyzed data in tabular form, including all conditions and parameters, including fully labeled graphs.
6. Presenting the intermediate results, and the final result.
7. Error analysis of the results, and comments.
8. Effective prose, detailing arguments leading to conclusions
9. Conclusion, summarizing briefly your most important results
10. Criticism, ideas, improving, etc.

*It is the policy of NSU to accommodate students with disabilities, pursuant to federal law, state law, and the University's commitment to equal educational opportunities. Any student with a disability who needs accommodations, for example in seating placement or in arrangements for examinations, should inform the instructor at the beginning of the course. Students with disabilities are encouraged to contact Services for Students with Disabilities, which is located in Kyser Hall, Room 237, telephone 357-6950 or (TTD) 357-4393.*